

CLAIMS

What is claimed is:

1. A method comprising:
performing connection management and mobility management functions between a wireless access communication unit and a cellular network base station using GSM (Global System for Mobile Communications) connection management and GSM mobility management; and
transporting call data over a wireless connection between the wireless access communication unit and the base station using a non-GSM over-the-air physical layer protocol.
2. The method of claim 1, further comprising establishing a plurality of bearer paths between the wireless access communication unit and the base station, each bearer path corresponding to a wired subscriber unit connected to the wireless access communication unit.
3. The method of claim 2, further comprising establishing and maintaining a plurality of SCCP (Signaling Connection Control Part) links between a cellular network base station controller, coupled to the base station, and a cellular network mobile switching center, one SCCP link for each of the bearer paths.
4. The method of claim 1, wherein transporting call data over the wireless connection comprises transporting the call data using an IS-661 format.
5. The method of claim 1, wherein transporting call data over the wireless connection comprises:
assigning, from among a plurality of time slots of a time frame, one or more duplex time slots to the wireless access communication unit, one of the duplex time slots being assigned for each of a plurality of wired subscriber units desiring to communicate over the wireless connection;

transmitting, over a first frequency band, user-to-base traffic messages from the wireless access communication unit to the base station during a user transmission segment in each of the duplex time slots; and

receiving, over a second frequency band, base-to-user traffic messages from the base station to the wireless access communication unit during a base transmission segment in each of the duplex time slots.

6. The method of claim 5, wherein the user transmission segment and the base transmission segment of each duplex time slot are separated by one-half the duration of the time frame.

7. The method of claim 1, wherein using a non-GSM over-the-air physical layer protocol comprises using a non-GSM over-the-air physical layer protocol end-to-end between the wireless access communication unit and a cellular network mobile switching center coupled to the base station.

8. The method of claim 1, wherein the connection management and mobility management functions provide at least call set-up, maintenance and release functions for each of a plurality of wired subscriber units coupled to the wireless access communication unit.

9. The method of claim 1, further comprising transporting the call data between the base station and a cellular network mobile switching center using a GSM protocol.

10. The method of claim 1, further comprising:
transmitting call data received from the wireless access communication unit over a backhaul connection from the base station to a cellular network base station controller;
relaying the call data received from the wireless access communication unit from the base station controller to a wireless network mobile switching center using a GSM protocol;

transmitting from the mobile switching center to the base station controller call data intended for the wireless access communication unit using the GSM protocol; and
relaying the call data intended for the wireless access communication unit to the base station over the backhaul connection.

11. The method of claim 1, wherein transporting call data over the wireless connection comprises transmitting signaling messages between the wireless access communication unit and the base station.

12. A machine-readable medium having stored thereon data representing instructions which, when executed by a machine, cause the machine to perform operations comprising:
performing connection management and mobility management functions between a wireless access communication unit and a cellular network base station using GSM (Global System for Mobile Communications) connection management and GSM mobility management; and
transporting call data over a wireless connection between the wireless access communication unit and the base station using a non-GSM over-the-air physical layer protocol.

13. The medium of claim 12, further comprising instructions which, when executed by the machine, cause the machine to perform further operations comprising establishing a plurality of bearer paths between the wireless access communication unit and the base station, each bearer path corresponding to a wired subscriber unit connected to the wireless access communication unit.

14. The medium of claim 12, wherein the instructions for transporting call data over the wireless connection comprise instructions which, when executed by the machine, cause the machine to perform further operations comprising:

assigning, from among a plurality of time slots of a time frame, one or more duplex time slots to the wireless access communication unit, one of the duplex time slots being assigned for each of a plurality of wired subscriber units desiring to communicate over the wireless connection;

transmitting, over a first frequency band, user-to-base traffic messages from the wireless access communication unit to the base station during a user transmission segment in each of the duplex time slots; and

receiving, over a second frequency band, base-to-user traffic messages from the base station to the wireless access communication unit during a base transmission segment in each of the duplex time slots.

15. The medium of claim 12, further comprising instructions which, when executed by the machine, cause the machine to perform further operations comprising:

transmitting call data received from the wireless access communication unit over a backhaul connection from the base station to a cellular network base station controller;

relaying the call data received from the wireless access communication unit from the base station controller to a wireless network mobile switching center using a GSM protocol;

transmitting from the mobile switching center to the base station controller call data intended for the wireless access communication unit using the GSM protocol; and

relaying the call data intended for the wireless access communication unit to the base station over the backhaul connection.

16. A mobile switching center,

the mobile switching center being connected to a base station controller, and communicating with the base station controller using a GSM protocol,

the mobile switching center also being connected to a wireless access unit that provides a wireless communication path using a non-GSM over-the-air physical layer protocol between wired subscriber units and a base station coupled to the base station controller, the mobile switching center performing with the wireless access unit connection management and mobility management functions using GSM connection management and GSM mobility management protocols end-to-end, the connection management and mobility management functions providing at least call set-up, maintenance and release functions for each of the wired subscriber units.

17. The mobile switching center of claim 16, further comprising a transcoding unit, wherein the mobile switching center is connected to the base station controller through the transcoding unit.

18. The mobile switching center of claim 16, wherein the base station controller and the mobile switching center communicate across a GSM A-interface.

19. The mobile switching center of claim 16, wherein the mobile switching center maintain a plurality of SCCP links with the base station controller, one SCCP link for each user interface over which a call is connected from one of the wired subscriber units.

20. The mobile switching center of claim 16, wherein the mobile switching center supports and maintains calls from the wired subscriber units to the mobile switching center via the base station and the base station controller.

21. A communication system, comprising:

a base station;

a wireless access communication unit connected to a plurality of wired subscriber units, the wireless access communication unit providing a communication path between the base station and the wired subscriber units, the communication path including a wireless connection over which the

wireless access communication unit and base station communicate using a non-GSM over-the-air physical layer protocol;

a base station controller connected to the base station; and

a mobile switching center connected to the base station controller, the mobile switching center and the base station controller communicating using a GSM protocol, the mobile switching center and the wireless access communication unit performing connection management and mobility management functions using GSM connection management and GSM mobility management protocols end-to-end, the connection management and mobility management functions providing at least call set-up, maintenance and release functions for each of the wired subscriber units.

22. The communication system of claim 21, wherein the non-GSM over-the-air physical layer protocol comprises an IS-661 over-the-air protocol.

23. The communication system of claim 21, wherein the base station comprises at least two backhaul transceivers.

24. The communication system of claim 23, wherein the backhaul transceivers comprise logical terminal endpoints, each backhaul transceiver supporting a first logical link for traffic signaling and a second logical link for operations, administration and management signaling.

25. The communication system of claim 24, wherein the base station multiplexes the first logical link and the second logical link of each of the backhaul transceivers onto a single time slot for communication to the base station controller.

26. The communication system of claim 24, wherein functional entities of the base station are addressable using service access point identifiers.

27. The communication system of claim 24, wherein the base station controller and the wireless access communication unit comprise endpoints for voice encoding and decoding.

28. The communication system of claim 24, wherein the base station controller and the wireless access communication unit comprise endpoints for encryption and decryption of bearer traffic.

29. The communication system of claim 24, wherein the base station controller and the wireless access communication unit comprise endpoints for forward error correction.

30. The communication system of claim 24, further comprising a transcoding unit, wherein the mobile switching center is connected to the base station controller through the transcoding unit.

31. The communication system of claim 24, wherein the base station controller and the mobile switching center communicate across a GSM A-interface.

32. The communication system of claim 24, wherein the wireless access communication unit is connected to the wired subscriber units through a local area telephone switch.

33. The communication system of claim 32, wherein the local area telephone switch comprises either a private branch exchange (PBX) or key telephone system (KTS).

34. The communication system of claim 32, wherein the wireless access communication unit comprises

a plurality of subscriber ports connected to the local area telephone switch over a plurality of trunks;

a plurality of user interfaces connected to the subscriber ports, one user interface for each subscriber port;

a radio transceiver; and

a controller connected to the user interfaces and the radio transceiver, the controller managing the transfer of data between the user interfaces and the radio transceiver.

35. The communication system of claim 34, wherein the user interfaces are individually addressable.

36. The communication system of claim 34, wherein the base station controller and the mobile switching center maintain a plurality of SCCP links, one SCCP link for each user interface over which a call is connected from one of the wired subscriber units.

37. The communication system of claim 34, wherein the wireless access communication unit sets up and maintains calls from the wired subscriber units to the mobile switching center via the base station and the base station controller.

38. The communication system of claim 24, wherein the base station supports a multiple access communication protocol, the base station establishing wireless communication paths with mobile user stations upon demand.